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“Logical solutions for managing component and manufacturing costs.”

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HP Deskjet 3940 Inkjet Printer

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Introduction

This unique analysis covers a Manufacturing Cost – Component Cost Benchmark Analysis of the HP Deskjet 3940 inkjet printer. This unit shipped directly to Cypress Labs. It was unpacked, and completely disassembled. Each part was identified, and the material costs and assembly times were estimated. From this data, we created a list of materials, arranged in a logical drawing structure (each sub-assembly through the top assembly). The parts/cost breakdown section of the report is intended to emulate an engineering drawing structure. This portion of the report shows the relationship between the material cost and labor, including the estimated applied overhead rate, for the product assembly.

Costing Methodology

This chart intends to show the flow of materials and costs in the manufacturing process.



MCA-CCB cost estimates, including labor costs and overhead costs, are based on specified volume run rates. The country of manufacturing origin (A client–chosen criteria) is identified on top of each worksheet in this report. Commodity materials are plastic resins, bulk metal materials in various forms, glass, etc. Commodity components are ICs, transistors, diodes, resistors, all other electronic components, printed circuit boards, connectors, filters, and any other item required for the assembly of the subject product. Costs estimated in this report do not include:

- **1. Profit margins incurred from sales from Contracted sub-assemblers (see detailed explanation in ANALYSIS STRUCTURE),
- **2. Profit margins incurred from sales from the CEM (Contract Equipment Manufacturer) to the Brand Name manufacturer, or
- **3. Profit margins incurred from the Brand Name manufacturer to the distribution channels.

HP Deskjet 3940 Printer

Product Description

The HP Deskjet 3940 is an entry level color inkjet printer. It delivers print speeds up to 16 ppm black and up to 12 ppm color. It prints 4 x 6-inch color photos without borders or up to 8.5 x 11-inch with borders in up to 4800-optimized dpi. It's compact, low-profile design and 80-sheet fold-up paper tray make it easy to use and store almost anywhere. Easy printer controls include on-screen menu with five print performance modes, plus convenient, one-click on-screen Print cancel to save paper and ink.

The HP Deskjet 3940 is 16.6" (W) x 5.6" (H) x 13.6" (D) and weighs 4.5 pounds. It comes with the printer, HP 21 Black/22 Tri-color Inkjet Print Cartridges (5 ml), HP Image Zone Express Photo and Imaging software on CD-ROM, Setup Poster, User's Guide, power supply, and power cord.

Product Specification

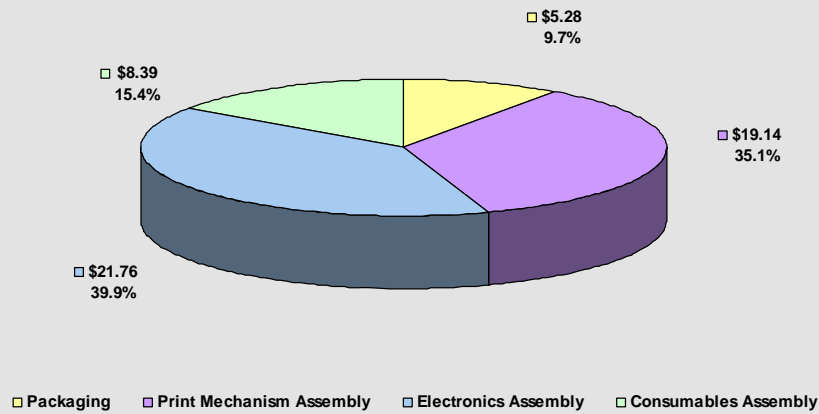
<i>Print Technology</i>	HP Thermal Inkjet
<i>Print Speed (Black)</i>	Draft: 16 ppm / Normal: 5.7 ppm / Best: 0.8 ppm
<i>Print Speed (Color)</i>	Draft: 12 ppm / Normal: 2.1 ppm / Best: 0.8 ppm
<i>Print Resolution (Black)</i>	Up to 1200-rendered dpi black
<i>Print Resolution (Color)</i>	Up to 4800 x 1200-optimized dpi color and 1200-input dpi
<i>Input Capacity</i>	80 sheets
<i>Output Capacity</i>	50 Sheets
<i>Duplex Printing</i>	Manual
<i>Media Sizes (Std.)</i>	Letter, legal, executive, US No. 10 envelope, cards
<i>Media Sizes (Custom)</i>	3" x 5" to 8.5" x 14"
<i>Media Types</i>	Paper (plain, inkjet, photo), envelopes, transparencies, labels, cards, HP Premium Media, iron-on transfers
<i>Monthly Duty Cycle</i>	500 pages
<i>Memory</i>	Integrated
<i>Connectivity</i>	USB
<i>Dimensions</i>	16.6" (W) x 5.6" (H) x 13.6" (D)
<i>Weight</i>	4.5 pounds
<i>Warranty</i>	1 year limited warranty

Product Cost Summary

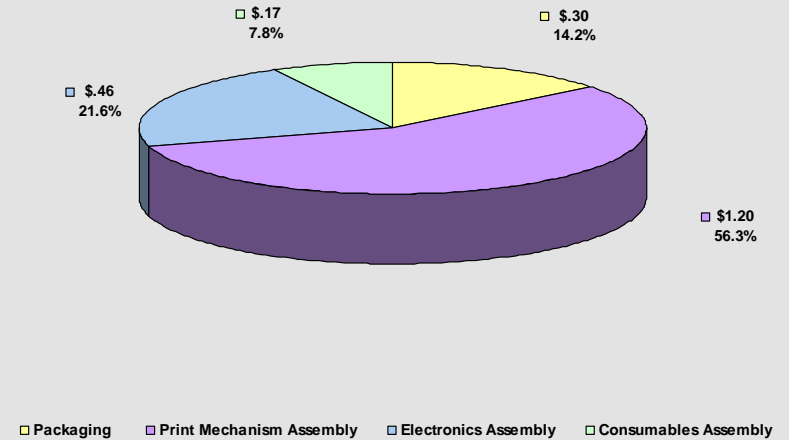
Total manufacturing cost estimate for the HP Deskjet 3940 printer manufactured in China at a volume of 2,000,000 units per year:

\$54.58

Cost Summary - Total Percentage Distribution



Labor Summary - Total Percentage Distribution



Analysis Structure

This report documents an estimate of the manufacturing cost of products at a specific manufacturing site, based upon specific production volumes. It estimates the following:

1. Minimum procurement costs of Commodity Components that are readily available to any world class manufacturer.
2. Manufacturing costs of Fabricated Components, Sub-Assemblies and Materials.

Private labeling or custom manufacturing has become pervasive for many products. These products are manufactured by offshore companies and sold to major domestic and international companies with their labels, documentation, and software included.

This report does not reflect the transfer costs of subassemblies in this type of multi-tiered product assembly operation. These transfer costs always include layers of markup, which is added to the manufacturing cost of the subassembly from the OEM supplier. These added margins may or may not have any relationship to the actual manufacturing costs, which makes them virtually impossible to include as a part of an estimate of the manufacturing cost. In some cases such as modem modules, LCD panels, and power supplies, these OEM transfer costs are widely known and may be shown as purchased parts in the report.

DESCRIPTION

This column is a brief description of the subassembly or part. Indentation of the part description denotes that the part belongs to a higher-level part listed above it.

REF

This column is used for two purposes. In the case of electronic printed circuit boards (PCBs), the manufacturer's reference designator for integrated circuits (ICs) appears in this column. However, sometimes the designators are not used or are unreadable. In these cases, no designator is placed in this column.

The second use for this column is to denote a subassembly that is itemized elsewhere or to identify the group of parts indented in subsequent rows. The word ref. is used for this purpose.

QTY

The QTY column indicates the number of parts in the subassembly that meets the part description.

EACH

The EACH column lists the estimated cost of the part. The value entered for purchase parts is the estimated purchase cost of the part described.

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Note: Overhead costs are included in the value entered for fabricated parts such as molded plastic, sintered metal, stampings, extruded, sheet-metal, castings, welded assemblies, machined parts, or other fabricated parts. These entries include the material, labor, and the estimated overhead cost (including tooling amortization) required for fabricating the part in an in-house machine shop facility. See page nine (Overhead Costs)

Purchased fabricated parts costs are estimated just like 'in house' parts. When it is obvious that a subcontractor made the part, a mark-up for the manufacturer margin is estimated and added.

TOTAL

The quantity of the parts used multiplied by the cost is listed in the TOTAL column.

TOOL OH: EA and TOTAL

The value entered here is the estimated amortized expenses for making and sustaining the specific major tooling (molds and metal dies or progressive tooling) needed to make the part. These costs are amortized over a 3 year period. When there is more than one part on this line, the value entered is the combined cost of tooling for the number of parts entered on this line.

In previous Cypress Labs reports (prior to 2003), the cost of the tooling has been included as a part of the part cost. The tooling cost has now been removed from the part cost and is treated as a separate value. It is added into the cost of the product on the 'Cost Summary Sheet'.

TIME (in sec): ASSY and PCB

These two columns categorize labor into the mechanical assembly of the parts of the product (i.e. nuts, bolts, screws, packing, taping etc.) and the assembly of electronics PCB (electronic assembly and soldering of single sided or two sided 'through hole' and 'SMT' construction). The numbers listed are in seconds. Not every row will have a time listed since the labor may have been accounted for in other operations such as plastic moldings or at the subassembly level. The times are usually listed at the beginning of a group of associated parts that are assembled together.

Dividing the labor into these categories allows different labor and overhead rates for each. These labor and overhead rates are listed on the Labor Summary sheet and are automatically applied to the proper column. The labor costs include QA and Test time in the area where the work is done and final test time is included in the FINAL PREP sheet.

NOTES

The note column provides an area to expand on the description. It frequently lists the type of plastic material, weight, PCB sizes, and other information that will help to identify the part or aid in the estimating process.

Glossary

There are many abbreviations, mnemonics, and initials used in these reports. This Glossary is a listing of these terms and a brief description of their meaning. If you find some to add please contact us.

- **Tool OH** - *Tooling Overhead*
- **SMT** - *Surface Mount Technology* (Labor time in seconds for assembly and testing the circuit board)
- **PCB** - *Thru-hole Printed Circuit Board* (Labor time in seconds for assembly and testing the circuit board)
- **OEM** - *Original Equipment Manufacturer*
- **QTY** - *Quantity*
- **REF** - *Reference*
- **Assy** - *Assembly*
- **MLO** - *Material Labor & Overhead cost*
- **P/N** - *Part number*
- **S/N** - *Serial number*
- **AC** - *Alternating Current*

HP Deskjet 3940 Printer**Types of metal**

st = steel

ss = stainless steel

ss shim = thin stainless steel

brs = brass

brnz = bronze

cpr = copper

alum = aluminum

ber-cpr = beryllium copper

ti = titanium

mg = magnesium

Types of Plastic

PVC = polyvinyl chloride

PS = polystyrene

PP = polypropylene

PE = polyethylene

PET = polyethyleneterephthalate

ABS = acrylonitrilebutadienestyrene

mylar = DuPont trade name for their PET film

POM = polyoxymethylene

PC = polycarbonate

DEL = DuPont trade name (Delrin) for polyacetal

PPE = polyphenylene

PPO = polyphenyleneoxide

PBT = polybutyleneterephthalate

Rubr = rubber (many types come under this heading)

Ny = nylon

PTFE = polytetrafluoroethylene (teflon)

Si Rubr = silicone rubber

PI = polyimide

PEI = polyetherimide

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